



ESTHETIC MANAGEMENT OF MAXILLARY THREE PEG LATERAL INCISORS: A CASE REPORT

Dentistry

Dr. Kriti Kapoor

M.D.S, Assistant Professor, Department of Conservative Dentistry and Endodontics, Faculty of Dental Sciences, Shree Guru Gobind Singh Tricentenary University, Gurugram - 122505, Haryana, India.

ABSTRACT

Maxillary lateral incisors vary in form and shape much more than any other tooth in the arch except the third molars. Microdontia is defined as a condition in which the teeth are smaller than their normal size. Microdontia of maxillary lateral incisor is commonly called as "peg lateral", where the teeth exhibit convergence of mesial and distal surfaces of crown to form a cone shape. A careful diagnosis and treatment plan, both are essential for the clinician to find the most effective and accurate approach according to the patient's requirement. A patient sometimes needs a multidisciplinary approach for correction of esthetics and occlusion. This case report describes a rare case of esthetic management in a young male patient aged 18 years having three peg laterals in upper left maxillary region, two of them placed labially and the third one placed palatally, also generalised Grade 3 fluorosis was present.

KEYWORDS

Peg lateral, Esthetic, Microdontia

INTRODUCTION

Abnormalities in tooth size, shape, and structure result from disturbances during the morpho-differentiation stage of development, and ectopic eruption, rotation and impaction of teeth result from developmental disturbances in the eruption pattern of the permanent dentition. (1,2)

Developmental anomalies common in teeth, include abnormalities in the structure of enamel and dentin, as well as in the shape, size, and number of teeth. Alterations in the size of the teeth include microdontia (teeth smaller than normal) and macrodontia (teeth larger than normal); both these conditions may either be generalized and involve all the teeth, or isolated to only one or several teeth. Microdontia are of three types, including true generalized microdontia, relative generalized microdontia, and localized microdontia. True generalized microdontia, which is commonly less seen in which, all the teeth are smaller in size than normal. In relative generalized microdontia, all the teeth are normal or slightly smaller, but because of larger than normal jaws, an illusion of microdontia is created. (2, 3)

On the other hand, localized microdontia, involves only a single tooth, and is less common in primary dentition than in permanent dentition. In Microdontia size of teeth is smaller than normal and could be limited to a single tooth or group of teeth or may involve all the teeth. Microdontia of maxillary lateral incisor is known as "peg lateral", where mesial and distal surfaces of crown converge to resemble cone shape. Their tooth is mostly shorter than normal teeth. (3,4) Maxillary lateral incisors vary greatly in shape when compared to other teeth in the mouth with an exception of the third molars.(5) If the variation is too great, it is considered a developmental anomaly. Developmental alterations very commonly associated with maxillary lateral incisors either unilaterally or bilaterally are microdontia, hypodontia, dens invaginatus and dens evaginatus (talon cusp). One of the common forms of localized microdontia is that which affects the maxillary lateral incisor, is a condition that has been called the 'peg lateral'. (6,7) The sides of peg lateral taper incisally, forming a peg or cone-shaped crown instead of parallel or diverging mesial and distal surfaces, It can occur either unilaterally or bilaterally. (8)

The most common form of microdontia is Peg lateral which are often referred to as underdeveloped, tapered conical shaped incisors (9). A peg-shaped tooth, defined by Grahnen as where incisal mesiodistal width of the crown of tooth is shorter as compared to cervical width. Hence, a peg lateral is defined as "an undersized, tapered, maxillary lateral incisor" which could be associated with anomalies, such as canine transposition and over retained deciduous teeth. (10)

Peg shaped lateral incisors occur in approximately 2% to 5% of the general population, and women show a slightly higher frequency than men. They are present identically on right and left, unilaterally or bilaterally, but some studies have shown more bilateral occurrence is more than unilateral. Peg laterals are related with other dental abnormalities such as tooth agenesis, maxillary canine first premolar

transposition, palatal displacement of one or both maxillary canine teeth, buccally displaced canine, and mandibular lateral incisor-canine transposition. (11-13)

There are multiple treatment options available for treatment of peg laterals.

It is necessary to have a discussion with patients regarding the treatment protocol. Treatment could be combination of orthodontic treatment first by alignment of teeth in the arch, direct composite restoration of peg laterals, indirect composites, crowns which are bonded, porcelain bonded to metal crowns, crown lengthening procedures to increase gingival heights then direct composite restorations, extractions followed by implant placement.(14-16)

Peg lateral incisors can often be linked with midline diastema because of the distal shift of central incisors.

Maxillary peg lateral incisors have been found to have greater prevalence than any other developmental malformations of teeth. The rate of prevalence of peg-laterals reported in few studies, showed variation from 0.6% to 9.9%.The prevalence of peg-shaped maxillary permanent lateral incisors overall is 1.8% out of which, rate of unilateral (0.8%) and bilateral peg-shaped maxillary permanent lateral incisors are approximately equal. However, amongst unilateral peg lateral incisors, left side (0.4%) is two times more likely to have peg laterals than than the right side (0.2%). (17, 18)

Due to poor esthetics, orthodontic, and periodontal issues for affected persons, peg-laterals are a major concern of dental practitioners.

There are various theories regarding aetiology of peg-shaped maxillary lateral incisors, but there is no consensus in the literature regarding the exact aetiology. Genetic factors play an important role and have been associated in the occurrence of peg laterals. Literature has suggested that the occurrence of peg-laterals is linked with genetics which is due to agenesis of the maxillary lateral incisors, causing the defective gene which expresses differently in a particular teeth. (19)

Granat, and Chapelle proposed that due to evolution, teeth dimensions got reduced and became more conic that in the evolution within a species a tooth is reduced in volume and becomes conic before disappearing. (20)

Brook also advocated a multifactorial theory regarding aetiology of peg-shaped maxillary lateral incisors and found a general trend stating that size of the teeth formed is smaller, if the hypodontia is more severe. (21)

Polder et al in a meta-analysis found differences in the prevalence rates of dental agenesis between races, sexes, and continents of origin. Also, many studies have shown dental anomalies among orthodontic

populations and have found different prevalence values when compared with data derived from general populations. (22)

Thus, it became necessary to investigate the epidemiologic features of peg-laterals, due to the strong association between peg-laterals and dental agenesis. Several reports have described the association between the presence of peg-shaped maxillary lateral incisors and other developmental anomalies. Peck et al. found more occurrence on the left side of the maxilla. In another study, female patients were found to have greater rate of hypodontia and microdontia than male patients, on the other hand, a higher number of male patients had supernumerary teeth and macrodontia. Individuals with malformed lateral incisors often present with a diastema in the midline, which is caused by distal movement of the central incisors. Due to their reduced size, malformed lateral incisors may also show formation of anterior diastemas. Unless other congenital etiologic factors or habits are present, these patients may exhibit otherwise normal dentitions. (23,24)

In the restoration of peg lateral incisors, there are many factors to be considered that depend on the patient's expectations and the expertise of dental practitioner. The type of treatment should be selected based on functional and esthetic requirements, extractions required, position of canines, and conservative treatment including Indirect and Direct Composite Resin restoration can be carried out for peg-shaped laterals depending on the material and the smile designs. It is essential to discuss these options with patients, their parents and the interdisciplinary team that are involved in treatment. It is essential that all options are discussed with patients as it involved early decision making. This article discusses peg-shaped laterals and the conservative treatment options that are available. Depending on the extent of defect and in order to improve the smile design, many different treatment options are available for correction of peg-shaped laterals. A combination of dental anomalies like anterior spacing, deep bite, peg laterals cannot be satisfactorily managed by orthodontic treatment alone. (39, 40) Efforts are needed to treat the patient using a multidisciplinary approach in order to provide excellent results.

The present case report shows a case with peg laterals managed by giving due consideration to the patient's esthetic concerns.

CASE REPORT

An 18-year-old male patient reported to the Department of Conservative Dentistry and Endodontics, Faculty of Dental Sciences, S.G.T University with the chief complaint of sensitivity to hot and cold and small sharp yellowish brown teeth in the upper left front tooth region.

Intraoral examination revealed three peg shaped lateral incisors seen in the maxillary left quadrant, two of them placed labially and the third one placed palatally & patient was complaining of sensitivity to hot and cold in labially placed pegs, palatally placed peg had occlusal interference. Also Generalised Grade 3 fluorosis was present. Palatally placed peg lateral was in cross bite and had occlusal interference. Generalised Grade 3 fluorosis was present.



(A-D): Pre-Operative Intraoral Views

(E) Radiographic evaluation revealed three separate clinical roots with single root canal for all the three maxillary lateral incisors



(F) A CBCT scan was performed with CS 9300 scanner

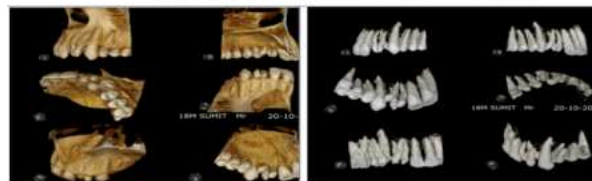


Figure 1: Pre-Operative Views (A-D), (E) IOPA, (F) CBCT

Thus based on these findings, it was diagnosed as Non Syndromic Unilateral Microdontic Peg Shaped Maxillary Lateral Incisors with Three Separate Roots.

Treatment Plan

After a detailed examination, treatment was planned. Since the patient was complaining of sensitivity, endodontic treatment of two labially placed peg lateral was planned. Extraction of palatally placed peg lateral incisor was planned, as the tooth was in cross bite and had occlusal interference. Esthetic built up of both the labially placed peg laterals with direct composite restoration to form a single lateral incisor tooth, followed by crown was planned. Composite veneering of anterior maxillary and mandibular teeth followed by finishing and polishing was to be done.



Figure 2: Diagnostic Wax-up

A Diagnostic wax-up was done on the study cast for patient's understanding and was shown to the patient before the procedure for his consent.

METHODOLOGY

Under rubber dam isolation, single visit root canal treatment was done for the two labially placed peg laterals. Access cavities were prepared under magnification. Working length was determined using # 10 K file. This was followed by cleaning and shaping using 4% NaOCl and 17% EDTA After completion of cleaning & shaping, both the canals were obturated by lateral compaction technique using Gutta-percha with AH Plus sealer (Dentsply, Konstanz, Germany) in single visit.



Figure 3: Clinical picture of root canal

In the same visit, extraction of palatally placed peg lateral incisor was

done under local anaesthesia. In the next appointment after one week, shade selection was done using vita shade guide and accordingly A1 shade was selected. Teeth were conditioned with 35% phosphoric acid gel for 10 seconds. Care was taken to completely rinse the etchant gel. Bonding agent was then applied and light cured. Composite built up was done using incremental technique, for the two endodontically treated peg laterals so as to simulate the anatomy of normal lateral incisor. Also built up was done on mesio-proximal area of left maxillary canine to build the shape.

The final layer consisted of a translucent enamel shade (BRILLIANT EverGlow; BL Trans [COLTENE]) that was applied over the facial surface and shaped using the composite contouring instrument and light cured. This was followed by selective composite built up of visible pitted surfaces of maxillary & mandibular teeth for the treatment of dental fluorosis. For this, tooth preparation was done restricting entirely to enamel. This was followed by etching, bonding and composite resin restoration of selected tooth surfaces using the selected shade (A1). The composite built up was then shaped with disks, diamond burs and abrasive strips. Patient was satisfied and desired aesthetic result was achieved.



Figure 4 (A) Pre & Postoperative View Right Lateral View (B) Pre & Post Left Lateral View (C) Pre & Postoperative Front Views (D) & (E) Post-Operative Views

DISCUSSION

The most common features for patients affected by hypodontia are Peg-shaped and missing lateral incisors. An improved dental appearance may be a strong motivating factor for these patients but to provide dental treatment for improvement of clinical condition and for achieving a stable and acceptable outcome could be difficult and lengthy procedure.

In this case report the chief complaint of patient was esthetic disharmony. The findings were a rare occurrence of three peg laterals along with generalised grade 3 fluorosis. The wax-up and cosmetic mock-up helped to address the final result of the proposed restoration and in three-dimensional visualization of the patient's face and smile. This helped in perceiving the expected results and to get the final approval of the patient. Direct composite restorations thus provided an economical and conservative option to help in build-up of peg laterals. The patient wanted minimally invasive, long-lasting esthetic solution, hence resin-based restorative build up was planned.

CONCLUSION

A direct composite restoration can be a successful alternative to more invasive, expensive procedures when restoring peg shaped incisors. Thus early diagnosis and treatment for correction of peg lateral can provide better aesthetics and confidence among the individual.

REFERENCES

- Neville DW, Damm DD, Allen CM, Bouquet JE. Abnormalities of teeth Oral and Maxillofacial Pathology. 2nd ed. Philadelphia, PA: Elsevier; 2005. p. 49–89.
- Shafer WG, Hine MK, Levy BM, Tomich CE. Textbook of oral pathology. 4th ed. Philadelphia: Saunders; 1993.
- Guttal KS, Naikmasur VG, Bhargava P, Bathi RJ. Frequency of developmental dental anomalies in the Indian population. Eur J Dent. 2010 Jul;4(3):263-9.
- Ufomata D. Microdontia of a mandibular second premolar. Oral Surg Oral Med Oral Pathol. 1988;65:637–8. doi: 10.1016/0030-4220(88)90150-8.
- Fekonja A. Prevalence of dental developmental anomalies of permanent teeth in children and their influence on esthetics. J Esthet Restor Dent 2017;(1.)
- Gupta S. K, Saxena P, Jain S, Jain D. Prevalence and distribution of selected developmental dental anomalies in an Indian population. Journal of Oral Science 2011;53(2):231-238, 2011.
- Fekonja A. Morphological diversity of permanent maxillary lateral incisors and their impact on aesthetics and function in orthodontically treated patients. Diagnostics (Basel). 2022;12(11):2759.
- Sharma A. Unusual localized microdontia: case reports. J Indian Soc Pedo Prev Dent 2001;19(1):38-39. 3. Tsai A. I and Chang P. Management of Talon Cusp Affecting the Primary Central Incisor: A Case Report.
- Prabhu RV, Rao PK, Veena K, Shetty P, Chatra L, Shenai P. Prevalence of Talon cusp in Indian population. J Clin Exp Dent. 2012;4(1):e23-27.
- Grahen H. Hypodontia in the permanent dentition. Odont Revy. 1956;7(3):1-00
- Davis PJ. Hypodontia and hyperdontia of permanent teeth in Hong Kong school children. Community Dent Oral Epidemiol; 15: 218-20, 1987.
- Abusalih A., Ismail H., Abdulgani A., Chlorokostas G., Abu- Hussein M; Interdisciplinary Management of Congenitally Agensis Maxillary Lateral Incisors: Orthodontic/Prosthodontic Perspectives, Journal of Dental and Medical Sciences 2016 15 (1), 90-99
- Hua F, He H, Ngan P, Bouzid W. Prevalence of peg-shaped maxillary permanent lateral incisors: A meta-analysis. Am J Orthod Dentofacial Orthop. 2013 Jul;144(1):97-109.
- Rathi S, Dhannawat P, Gilani R, Vishnani R. A Multidisciplinary Aesthetic Treatment Approach for Peg Lateral of the Maxillary Incisors. Cureus. 2022 Sep 15;14(9):e29184.
- Shah, Paridhi S.; Kariya, Pratik B.; Dave, Bhavna H.. Coexisting Peg-Shaped Lateral Incisor and Hypodontia in a 9-Year-Old Child. Journal of Integrated Health Sciences 8(2):p 95-97, Jul–Dec 2020
- Miller WB, McLendon WJ, Hines FB III (1987) Two treatment approaches for missing or peg shaped maxillary lateral incisors. A case study on identical twins. Am J Orthod Dentofacial Orthop 92(3):249–256.
- Hua F, He H, Ngan P, Bouzid W. Prevalence of peg-shaped maxillary permanent lateral incisors: A meta-analysis. Am J Orthod Dentofacial Orthop. 2013 Jul;144(1):97-109
- Yazıcıoğlu O, Yıldırım Üçüncü M, Demirci M. The prevalence of peg-shaped maxillary permanent lateral incisors in the Turkish population. EDR. 2024;2(2):39-43
- Burzynski NJ, Escobar VH. Classification and genetics of numeric anomalies of dentition. Birth Defects Orig Artic Ser. 1983;19:95–106.
- Granat J, Chapelle P. Dental agenesis, hypergenesis and evolution. Paris: Actual Odontostomatol; 1988:31-48.
- Brook AH, Elcock C, Al-Sharood MH, McKeown HF, Khalaf K, Smith RN. Further studies of a model for the etiology of anomalies of tooth number and size in humans. Connect Tissue Res 2002;43: 289-95.
- Polder BJ, Van'T Hof MA, Van der Linden FP, Kuijpers-Jagtman AM. A meta-analysis of the prevalence of dental agenesis of permanent teeth. Community Dent Oral Epidemiol 2004;32:217-26.
- Peck S, Peck L, Kataja M. Mandibular lateral incisor-canine transposition, concomitant dental anomalies, and genetic control. Angle Orthod 1998;68(5):455e66.
- Peck S, Peck L, Kataja M. Prevalence of tooth agenesis and peg-shaped maxillary lateral incisor associated with palatally displaced canine (PDC) anomaly. Am J Orthop Dentofacial Orthop 1996;110(4):441e3